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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/798,556	03/12/2004	Hiromasa Sato	250241US3CONT	6465

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EXAMINER

CHANG, AUDREY Y

ART UNIT PAPER NUMBER

2872

DATE MAILED: 04/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/798,556

Applicant(s)

SATO ET AL.

Examiner

Audrey Y. Chang

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 February 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 3-7 and 12-14 is/are pending in the application.
- 4a) Of the above claim(s) 14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 3-7, 12 and 13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION***Remark*

- This Office Action is in response to applicant's amendment filed on February 22, 2005, which has been entered into the file.
- By this amendment, the applicant has amended claims 3-7, has canceled claims 1-2, and 8-11 and has newly added claims 12-14.
- **Claim 14 (newly submitted) is withdrawn** from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected "species", there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on September 20, 2004. Claim 14 is **not** even supported by the specification which therefore does not read on the elected species, **Figure 1. The amendment to claim 4 and the newly added claim 12** recite the incoming-side and outgoing-side diffraction gratings are formed **BOTH** in the surfaces of the transparent substrate **and** in a single layer inorganic film formed on the surfaces, **do not** really read on the elected species, **Figure 1**, (and is not supported by the specification either for the reasons stated below). *Figure 1, shows that the gratings are formed directly in the surfaces of the transparent substrate.* The feature concerning the diffraction gratings being formed in a single layer of inorganic film on the substrate is disclosed in **non-elected species**, ( concerning Figures 7, 10 and 11). To show good sport for the applicant, claims 3-7 and 12-13 are still be examined **but only with the feature** reads on the elected specifies Figure 1, namely the diffraction gratings are formed in the surfaces of the transparent substrate.
- Claims 3-7 and 12-13 remain pending in this application.

*Response to Amendment*

1. The amendment filed on February 22, 2005 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: **the newly amended claim 4 and newly submitted claim 12** recite the following features “a diffraction grating ... formed in an incoming-side surface and an outgoing side surface of a transparent substrate” “an incoming-side diffraction grating disposed in a central region of the incoming-side surface and at least one (or two for claim 12) outgoing-side diffraction grating disposed in the outgoing-side surface” and “the incoming-side diffraction grating and the at least one outgoing-side diffraction grating are formed in a single layer inorganic film formed on the incoming-side and outgoing-side surfaces”. The specification **FAILS** to give the support for the incoming-side diffraction grating and outgoing-side diffraction grating to be formed **BOTH** in the incoming-side surface and outgoing-side surfaces of the transparent substrate **and** in a single layer inorganic film formed on the surfaces. Furthermore, **claim 3 has been amended**, (as depends from claim 4) to include the feature having the “incoming-side diffraction grating and the at least one outgoing-side diffraction grating formed **directly** in the incoming-side and the outgoing-side surfaces” which is not supported by the specification either, (with the features inherent from claim 4).

Applicant is required to cancel the new matter in the reply to this Office Action.

*Claim Rejections - 35 USC § 112*

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. **Claims 3-7 and 12-13 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The reasons for rejection based on the newly added features are set forth in the paragraph above.

4. **Claims 3-7 and 12-13 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to **enable** one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The specification and the claims **fail** to teach how could the diffraction grating, (both the incoming-side one and outgoing-side one) is capable of being formed *in* the surface of the substrate and *at same time* being also formed in a single layer inorganic film formed on the surface of the substrate.

#### *Claim Objections*

5. **Claims 3-7 are objected to because of the following informalities:**

(1). **Claim 4 has been amended** to include the feature having the incoming-side diffraction grating and the outgoing-side diffraction grating formed in **both** the incoming-side and outgoing side surfaces of the substrate **and** in a single layer of inorganic film, which is confusing and impossible, for the reasons stated above. **Claim 3 has been amended to depend** from claim 4 to recite the feature having the gratings formed **directly** in the incoming-side and outgoing-side surface of the substrate which is completely confusing since it contradicts to its based claim (claim 4). Where exactly are these diffraction gratings formed? It is very confusing by the statements in claims 3 and 4.

Art Unit: 2872

(3). The amended phrase “saw-tooth shape” recited in claim 7 is confusing since it is not clear if this is referred to the saw-tooth or the pseudo sawtooth diffraction grating as recited in its based claim 6.

**Appropriate correction is required.**

*Claim Rejections - 35 USC § 103*

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. **Claims 3-6 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Nakanishi et al (PN. 6,728,034) and Perry et al (PN. 5,907,436).**

*Claims 3-4 have been significantly amended which necessitates the new grounds of rejections.*

Nakanishi et al teaches a *diffraction optical element* that is comprised of a transparent *substrate* (1, Figures 6, 7A, 7B, 10 and 22), wherein a first *diffraction grating pattern* (4), serves as the *incoming-side diffraction grating*, is formed on the *central* region of the incoming-side surface of the *transparent substrate* wherein an external light incidents (L0), and at least one *second diffraction gratings* (5 and 6, or 9 and 10), serves as the at least one *outgoing-side diffraction grating*, formed on the opposite (or *outgoing-side*) surface, (with respect to the first diffraction grating pattern), of the substrate. Nakanishi et al teaches that the *pitch* of the incoming side diffraction grating pattern is the *same* as the *pitch* of the outgoing-side diffraction grating pattern, (please see column 3, lines 38-40 and column 10, lines 40-52). Nakanishi et al further teaches that each of the first and second diffraction grating patterns comprises a plurality of *slits* and as demonstrated by the drawings 1-17 and 19A, the slit pattern comprises *concave/convex shape*, (please see columns 3-4, 6, 8, and 10). Nakanishi et al teaches that the at least one outgoing-side diffraction gratings (5 or 6) is configured to receive the light diffracted from the incoming-

Art Unit: 2872

side diffraction grating (4). And the outgoing-side diffraction grating can comprise *two* of such gratings, (with respect to newly added claim 12) and they could be reflection type of gratings as demonstrated in Figures 6, 7A, and 7B).

With regard to amended claim 3, the diffraction gratings are formed *directly* in the surfaces of the substrate.

**The amended claim 4 and newly added claim 12** include the feature of having the incoming-side diffraction grating and the at least one (or two as in claim 12) outgoing diffraction gratings formed in **both** the incoming-side surface and outgoing side surfaces of the substrate **and** in a single layer of inorganic film **formed on** the surfaces of the substrate. This feature is not supported by the specification and it is impossible to be achieved. Furthermore, the feature of having the diffraction gratings formed in the single layer of inorganic film is not disclosed in the elected species. This feature therefore cannot really be examined with details here. It is however known in the art to form diffraction grating in a single layer of inorganic film formed on the substrate, as taught by Perry et al in Figure 3, as an alternative option to form the diffraction grating with additional optical property provided by the inorganic layer material to achieve other desired purpose. Such modification therefore is obvious to one skilled in the art.

With regard to claim 5, Nakanishi et al teaches that the outgoing side diffraction gratings (5 and 6, Figures 6-7B) may also be *reflection* type diffraction gratings.

With regard to claim 6, Nakanishi et al teaches that the outgoing side diffraction gratings (9 and 10, Figure 10) have a saw-tooth like diffraction grating profile.

With regard to claim 12, Nakanishi et al teaches that the diffractive optical element can be used in an optical pickup device which could be considered as a wavelength measurement apparatus.

Art Unit: 2872

8. Claims 7 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patents issued to Nakanishi et al and Perry et al as applied to claims 1 and 12 above, and further in view of the patent issued to Chen et al (PN. 5,914,811).

The diffractive optical element taught by Nakanishi et al in combination with the teachings of Perry et al as described for claims 1 and 12 above have met all the limitations of the claim. The Nakanishi et al reference teaches that the outgoing side diffraction gratings may have *saw-tooth like shape* (9 and 10 in Figure 10), however it does not teach explicitly that the diffraction gratings are of *pseudo* saw-tooth like shape that is approximated by multiple stepped stairs. It also does not teach explicitly that the incoming diffraction grating is of saw-tooth shape. However using multiple stepped stairs structure to *approximate* the desired diffraction grating profile is rather well known in the art for it provides good accuracy for approximating the desired profile. Chen et al in the same filed of endeavor teaches explicitly that a *blazed* grating (i.e. saw-tooth like grating) can be approximated by blazed grooves with M-step stairs, (please see Figures 1 and 2). Chen et al teaches that the step heights is selected to best approximate the diffraction profile. It would then have been obvious to one skilled in the art to apply the teachings of Chen et al to use M-step stairs structure to approximate the saw-tooth like gratings and to make the incoming-side grating with such structure for the benefit of providing more accurate grating profiles for the diffraction gratings.

#### *Response to Arguments*

9. Applicant's arguments filed on February 22, 2005 have been fully considered but they are not persuasive. The newly amended and newly submitted claims have been fully considered and they are rejected for the reasons stated above.

10. In response to applicant's arguments which stated that the cited Nakanishi reference does not teach that the incoming side and outgoing side diffraction gratings are formed in a single layer of



Art Unit: 2872

inorganic layer formed on the substrate surfaces, the examiner respectfully disagrees for the reasons stated below. Firstly the specification of the instant application also fails to disclose such also in the elected species Figure 1 wherein the diffraction gratings are formed *directly* in the surfaces of the substrates. Secondly, the claims (4 and 12) also have the gratings formed in the surfaces of the substrates which makes it *impossible* for the gratings to form in the single layer of inorganic film.

### *Conclusion*

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

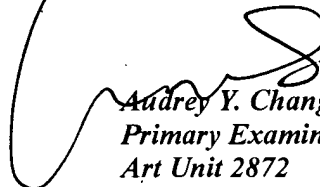
### *Contact Information*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

Art Unit: 2872

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



*Audrey Y. Chang*  
**Primary Examiner**  
**Art Unit 2872**

A. Chang, Ph.D.